

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A radioactive gas measurement apparatus, comprising:

a radiation detection system having a main detector and a sub-detector that are arranged at positions diametrically opposed to each other with respect to a sampling chamber, into or out of which a radioactive gas flows, and a shield for shielding a background radiation surrounding the detectors; and

an anticoincidence counter circuit in a measuring circuit, in which a particular radiation emitted from the radioactive gas is measured with an anticoincidence count processing using signals of both detectors,

wherein the sub-detector is a scintillation detector and the main detector is a plate-shaped semiconductor detector having a t/L ratio of 1 or less.

2. (Currently Amended) A radioactive gas measurement apparatus, comprising:

a main detector and a first sub-detector having the shape of a well and surrounding the main detector that are arranged at one of two positions diametrically opposed to each other with respect to a sampling chamber, into or out of which a radioactive gas flows;

a second sub-detector arranged at the other of the two positions;  
and

an anticoincidence counter circuit as a measuring circuit, in which a particular radiation emitted from the radioactive gas is measured with an anticoincidence count processing using signals of the main detector and two sub-detectors,

wherein the first and second sub-detectors are scintillation detector and the main detector is a detector made from a plate-shaped semiconductor having a t/L ratio of 1 or less.

3. (Previously Amended) The radioactive gas measurement apparatus according to Claim 1, wherein the thickness of said plate-shaped semiconductor detector is between 2 mm and 7 mm.

4. (Previously Amended) The radioactive gas measurement apparatus according to Claim 1, wherein said shield for shielding the background radiation is made of a material that does not emit a characteristic X ray within a range of energy from 70 to 90 keV inclusive.

5. (Currently Amended) A failed fuel detection system, wherein radiation intensity emitted from Xe-133 contained in an off-gas in a reactor condensate system is measured by a radioactive gas measurement apparatus according to claim 1, the measurement values are collected on ~~the~~ a time series, and the resulting time-series data is analyzed to detect a fuel failure in a reactor.

6. (Previously Added) The radioactive gas measurement apparatus according to Claim 2, wherein the thickness of said plate-shaped semiconductor detector is between 2 mm and 7 mm.

7. (Previously Added) The radioactive gas measurement apparatus according to Claim 2; wherein said shield for shielding the background radiation is made of a material that does not emit a characteristic X ray within a range of energy from 70 to 90 keV inclusive.

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8. (Currently Amended) A failed fuel detection system, wherein radiation intensity emitted from Xe-133 contained in an off-gas in a reactor condensate system is measured by a radioactive gas measurement apparatus according to claim 2, the measurement values are collected on ~~the~~ a time series, and the resulting time-series data is analyzed to detect a fuel failure in a reactor.